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(54) Acid composition for washing the exterior of railway carriages and the like.

(57) A composition for washing the exterior of railway carriages and the like consisting of an aqueous dispersion containing pectin as the thickening agent, and possibly xanthan gum and sorbitol, and having acid pH due to the presence of one or more mineral or organic acids chosen from the group of acids able to dissolve iron oxide.

Said composition is prepared by firstly mixing the pectin and if present the xanthan gum and sorbitol with water at 60-85°C, and then adding the acid or acids at 35-40°C. The composition obtained has advantages of applicational and ecological character.

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ACID COMPOSITION FOR WASHING THE EXTERIOR OF RAILWAY CARRIAGES AND THE LIKE

This invention relates to an acid composition for washing the exterior of railway carriages and the like, and to the relative preparation process.

The basic reason for washing the exterior of railway carriages is to remove the iron oxide which deposits on the paintwork and windows. Said iron oxide originates mainly from the abrasion due to the friction generated between the brake blocks and the wheels, and to a lesser extent originates from all parts of the underbody and rails. In all cases, washing is carried out with acid compositions and it is therefore assumed that the paintwork is intact.

The products currently used are strong mineral acids thickened with various substances, and can be divided essentially into two types:
the concentrated type, which generally consists of a product in powder form which is diluted with water before use;
the type ready for use, which consists of a creamy paste able to adhere to the vertical surfaces to be washed.

The products of concentrated type have various drawbacks in their application: they are formed from aggressive substances and therefore have to be handled with care; on dilution they give rise to the formation of lumps which obstruct the spray nozzles; the stability of the dispersions is very brief; finally, it is always possible to make mistakes in the dilution proportions, with consequent possibility of damage both to the carriages and to the person if the products are too concentrated, or of not obtaining effective washing if the dispersion is too dilute.

Some of these drawbacks are obviated by using products ready for use, however the currently known products of this type do not satisfactorily solve the problem of washing the exterior of railway carriages. Firstly, the products have pollutant characteristics because of the high concentration of surface active agents added to emulsify the fatty substances used in the compositions as thickening agents. During summer months, said fatty substances dry rapidly on the paintwork and on the windows, and their removal is difficult and laborious. Finally, the surface active agents and fatty substances strongly inhibit the action of the acids, because of which their concentration has to be increased, resulting in extra cost but in particular in increase in the danger of the product to the personnel using it.

We have now discovered a new composition for washing the exterior of railway carriages, which obviates the drawbacks associated with the use of products of the known art.

In particular, we have surprisingly found that acid compositions for washing the exterior of railway carriages can be prepared using pectin as the thickening agent, a substance well known to be unsuitable for use in a strongly acid environment (pH 0-1) as a gelling agent.

The composition according to the invention is characterised by consisting of an aqueous dispersion containing pectin as the thickening agent, and possibly xanthan gum and sorbitol, and having acid pH due to the pressence of one or more mineral or organic acids chosen from the group of acids able to dissolve iron oxide.

Said composition is prepared by a method characterised by mixing pectin, xanthan gum and sorbitol with water at 60-85°C, cooling to 45-50°C and adding the acids at this temperature.

These and further characteristics and advantages of the composition and of the relative preparation process according to the present invention will be more apparent from the detailed description given hereinafter by way of non-limiting example.

The acids used in the composition are preferably sulphuric acid and hydrochloric acid, but other mineral or organic acids can be used provided they are able to dissolve iron oxide, such as phosphoric acid, oxalic acid, thioglycolic acid, citric acid and sulphamic acid.

The content of the various substances in the composition is as follows, expressed in percentage by weight:
pectin 1-10%
xanthan gum 0-5%
sorbitol 0-50%
HCl 0-30.0%
H_2SO_4 0-30.0%
H_2O difference to 100%
in which at least one of the two acids is other than zero.

Preferably, the content of the various substances in the composition is as follows, expressed in percentage by weight:
pectin 2-3%
xanthan gum 0.5-2%
sorbitol 4-5%
HCl 1-3%
H_2SO_4 2-4%
H_2O difference to 100%

The pectin constitutes the essential component of the composition and exercises a thickening effect on the composition itself.

The xanthan gum improves the thickening characteristics of the pectin, and its presence is important to prevent the dispersion breaking down.

The effect of the xanthan gum can also be attained with its derivatives or with other thickening agents, such as celluloses, however the stability of these against strong acids is very low. Sorbitol, which is added in the form of a 70 weight% syrup, improves the wetting characteristics of the mixture so that its application is more uniform, droplets do not form and there is no drying. In practice, the sorbitol exerts a surprising surface-active effect in the mixture.

The sorbitol can be replaced by glycols, for example ethylene, propylene, polyethylene or polypropylene glycol, which however cannot be used if surfaces painted with alkyd paints are to be treated.

In order to attain maximum washing effectiveness, the composition simultaneously contains two acids, however a single acid can also be used.

To prepare the composition according to the invention, the pectin and possibly the xanthan gum and sorbitol are poured into water, the mixture agitated with very violent agitation while being heated to a temperature of between 60 and 85°C, and this temperature maintained under agitation for minutes. It is then cooled to a temperature of between 45 and 50°C, the acid or acids added, and this temperature maintained for 14-20 hours without agitation. In this manner a composition of syrupy, ungelled fluid consistency is obtained which after subsequent cooling to 25°C is packaged in cartons, drums or other types of container, which in all cases must be of non-metallic type.

It should be noted that it is important to add the acid in the sequence and under the conditions described, ie the acid must be added as the last component when the pectin has already dissolved, and at a lower temperature than the temperature at which the organic products are mixed with the water, to prevent any rapid degradation of the pectin.

In addition to the stated applicational advantages, the composition according to the invention offers great advantage over known products from the ecological viewpoint, especially when the carriages are washed in stations or in carriage parks having no adequate effluent plant, in that there is no risk of pollutant substances entering the ground. In this respect, the organic components of the composition are completely innocuous as they are products widely used in the foodstuffs field, and in addition their concentration in the product is such that the wash effluents have an extremely low organic content, the acidity of the composition being very low compared with that of known products and is rapidly neutralised on contact with calcareous materials in the ground.

A further advantage of the composition according to the invention is that when sprayed on to the carriage wall it resists drying for a time greater than that of known products, thus resulting in higher efficiency.

Claims

1. A composition for washing the exterior of railway carriages and the like consisting of an aqueous dispersion characterised by containing pectin as the thickening agent, and possibly xanthan gum and sorbitol, and having acid pH due to the presence of one or more mineral or organic acids chosen from the group of acids able to dissolve iron oxide.

2. A composition as claimed in claim 1, characterised in that said acid or acids are chosen from the group consisting of sulphuric acid, hydrochloric acid, phosphoric acid, oxalic acid, thioglycolic acid, citric acid and sulphamic acid.

3. A composition as claimed in the preceding claims, characterised by simultaneously containing sulphuric acid and hydrochloric acid.

4. A composition as claimed in claim 1, characterised by having a pectin content of between 1 and 10% by weight, and preferably of between 2 and 3% by weight.

5. A composition as claimed in claim 1, characterised by having a xanthan gum content of between 0 and 5.0% by weight and preferably between 0.5 and 2% by weight.

6. A composition as claimed in claim 1, characterised by having a sorbitol content of between 0 and 50% by weight and preferably of between 4 and 5% by weight.

7. A composition as claimed in claim 1, characterised by having an HCl and H_2SO_4 content of between 0 and 30% and between 0 and 35% by weight respectively, in which at least one of said acids has a content other than zero, and preferably of between 1 and 3% and between 2 and 4% by weight.

8. A composition as claimed in claim 1, characterised by, if xanthan gum is absent, containing derivatives of this latter or cellulose.

9. A composition as claimed in claim 1, characterised by, if sorbitol is absent, containing a glycol chosen from the group consisting of ethylene glycol, propylene glycol, polyethylene glycol and polypropylene glycol.

10. A process for preparing a composition for washing the exterior of railway carriages and the like consisting of an aqueous dispersion containing between 1 and 10% by weight of pectin as the thickening agent, and possibly between 0 and 50% by weight of xanthan gum and between 0 and 50%

by weight of sorbitol, and having acid pH due to the presence, in a quantity of between 1 and 35% by weight, of one or more mineral or organic acids chosen from the group of acids able to dissolve iron oxide, characterised by mixing the pectin and possibly the xanthan gum and sorbitol with water, and then adding the required acid or acids.

11. A process as claimed in claim 10, characterised in that the pectin and if present the xanthan gum and sorbitol are mixed with water at a temperature of between 60 and 85°C.

12. A process as claimed in claim 10, characterised in that the acid or acids are added at a temperature of between 45 and 50°C.